CLAIMS:

1.   A magnetic resonance imaging method comprising
    -   acquisition of magnetic resonance signals including application of diffusion
        weighting and involving a plurality of diffusion weighting strengths and a plurality of
        diffusion directions
5   -   reconstruction of an object dataset from the magnetic resonance signals
    -   the object dataset assigning apparent diffusion coefficients to voxels in a
        multidimensional geometric space and
    -   identifying the occurrence of a single or several diffusion directions in individual
        voxels of the object dataset.
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2.   A magnetic resonance imaging method as claimed in Claim 1, wherein the
apparent diffusion coefficients for individual voxels are decomposed into contributions for
the respective diffusion direction(s) for the voxel at issue.

15 3.   A magnetic resonance imaging method as claimed in Claim 2, wherein the
decomposition of the apparent diffusion coefficients is done on the basis of equal diffusion
strengths for the identified principal diffusion directions in the voxel at issue.

4.   A method of analysis of an object dataset assigning apparent diffusion
20 coefficients to voxels in a multidimensional geometric space, the analysis comprising
identifying the occurrence of a single or several diffusion directions in individual voxels of
the object dataset from a plurality of diffusion weighting strengths and a plurality of diffusion
directions for individual voxels.

25 5.   A computer program for analysis of an object dataset assigning apparent
diffusion coefficients to voxels in a multidimensional geometric space, the computer program
comprising instructions to identify the occurrence of a single or several diffusion directions
in individual voxels of the object dataset from a plurality of diffusion weighting strengths and
a plurality of diffusion directions for individual voxels.

6.   A magnetic resonance imaging system arranged to

- acquisition (1) of magnetic resonance signals including application of diffusion weighting and involving a plurality of diffusion weighting strengths and a plurality of diffusion directions

- reconstruction (2) of an object dataset from the magnetic resonance signals

- the object dataset assigning apparent diffusion coefficients to voxels in a multidimensional geometric space and the magnetic resonance imaging system including an image processing unit (3) to

- identify the occurrence of a single or several diffusion directions in individual voxels of the object dataset.